

## REMARKS

The applicant has amended the claims as set out above and provides the following remarks that fully address each issue raised by the office communication mailed September 17, 2001.

Canceled Claims. Claims 3 and 4 are canceled without prejudice.

Claim Numbering Concerns. Claims 183-191 have been renumbered as claims 165-173 as suggested by the examiner.

Informality Concerns. With respect to claims 1, 15, 16, and 23, the steps have been consecutively labeled with letters as suggested by the examiner.

Allowable Subject Matter. The examiner found claims 4, 26-29, 165-168, and 170 allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The applicant has amended independent claim 1, as suggested by the examiner, to include the limitations of claims 3 and 4 which were originally made ultimately dependent on claim 1. Claims 3 and 4 have been formally cancelled above. Because claims 26-29, 165-168, and 170 are now made ultimately dependent on an allowable base claim these claims, as well as remaining claims 2, 5-25, 169, and 171-173 are also allowable. In re Fine, 837 F.2d 1071 (Fed. Cir. 1988).

The applicant has amended the claims solely to expedite the examination of this initial United States national stage application without waiving any rights to have the claims as originally recited in the application examined as part of a division, continuation, continuation-in-part, or other application without any reduction in claim breadth.

The applicant respectfully requests a telephone interview with the examiner to address any remaining concerns.

Version With Markings To Show Changes Made. Pursuant to 37 C.F.R. §1.121, the applicant submits a marked up version of the claims to show changes made beginning on the next full page:

C

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claim 1 (twice amended).

A method of producing a mammal comprising the steps of:

- a. collecting sperm cells from a male of a species of mammal;
- [d.] b. establishing an insemination sample having no more than 10% of the [a low] number of said sperm cells relative to a typical insemination sample;
- [e.] c. inserting said insemination sample [having said low number of said sperm cells] into a female of said species of said mammal;
- [f.] d. fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable to a typical insemination dosage[; and], wherein said steps of inserting said insemination sample into a female of said species of said mammal and fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable to the typical insemination dosage are each accomplished in a field environment; and
- [g.] e. producing an offspring mammal.

Claim 2 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1 wherein said step of fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable to a typical insemination dosage comprises the step of fertilizing said at least one egg within said female of said species at success levels selected from the group consisting of at least 35%, at least 41%, at least 50%, and at least 90% [collecting sperm cells from a male of a species of mammal comprises the step of collecting said sperm cells from said male of said species of said mammal selected from the group consisting of bovines, and equines].

Claim 3 (cancel).

Claim 4 (cancel)

Claim 5 (twice amended).

A method of producing a mammal as described in claim [3] 1 wherein said female of said species of said mammal has uterine horns and wherein said step of inserting said insemination sample into said female of said species of said mammal comprises the step of inserting said insemination sample both ipsi- and contra-lateral within the uterine horns of said female of said species of said mammal.

Claim 6 (once amended).

A method of producing a mammal as described in claim [3] 1 wherein said female of said species of said mammal has at least one uterine horn and wherein said step of inserting said insemination sample into said female of said species of said mammal comprises the step of inserting said insemination sample deep within said uterine horn.

Claim 7 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 5 wherein said step of inserting said [sorted artificial] insemination sample into a female of said species of said mammal further comprises the step of inserting said [sorted artificial] insemination sample deep within said uterine horns.

Claim 8 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 6 wherein said step of inserting said [sorted artificial] insemination sample into a female of said species of said mammal further comprises the step of inserting said [sorted artificial] insemination sample within said uterine horn through the use of embryo transfer equipment.

Claim 9 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 7 wherein said step of inserting said [sorted] insemination sample into a female of said species

of said mammal further comprises the step of inserting said [sorted artificial] insemination sample within said uterine horns through the use of embryo transfer equipment.

Claim 10 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 5 wherein said step of inserting said [sorted artificial] insemination sample into a female of said species of said mammal comprises the step of inserting said [sorted artificial] insemination sample twelve hours after the time which is generally regarded as optimal for a single [artificial] insemination.

Claim 11 (twice amended).

A method of producing a mammal as described in claim 9 wherein said step of establishing an insemination sample comprises the step of establishing an unfrozen insemination sample, wherein said step of inserting said insemination sample into a female species of said mammal occurs not later than about seventeen hours from said step of establishing said insemination sample having [a low number] no more than 50% of the number of said sperm cells relative to the typical artificial insemination dosage.

Claim 12 (twice amended).

A method of producing a mammal as described in claim 9 wherein said step of establishing an insemination sample comprises the step of establishing an unfrozen insemination sample, wherein said step of inserting said insemination sample into a female species of said mammal occurs not later than about ten hours from said step of establishing said insemination sample having [a low number] no more than 50% of the number of said sperm cells relative to the typical artificial insemination dosage.

Claim 13 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1 further comprising the [wherein said] step of determining a sex characteristic of a plurality of

said sperm cells [comprises the step of staining said sperm cells with at least about 38 micromolar content of stain].

Claim 14 (once amended).

A method of producing a mammal having a predetermined sex as described in claim 13 further comprising the [wherein said] step[s] of [determining the sex characteristic of a plurality of said sperm cells and sorting] separating said sperm cells according to the determination of said sex characteristic [comprise the steps of:

- a. establishing a cell source which supplies sperm cells to be sorted;
- b. chemically coordinating a sheath fluid to create a sheath fluid environment for said sperm cells which is coordinated with both a pre-sort and a post-sort sperm cell fluid environment;
- c. sensing a property of said sperm cells;
- d. discriminating between said sperm cells having a desired sex characteristic; and
- e. collecting said sperm cells having the desired sex characteristic].

Claim 15 (twice amended).

A method of producing a mammal as described in claim 14 wherein said step of separating said sperm cells according to the determination of their sex characteristic comprises the steps of:

- a. establishing a sperm cell source which supplies sperm cells to be separated;
- [c] b. sensing a property of said sperm cells;
- [d] c. discriminating between said sperm cells having a desired sex characteristic; and
- [e] d. collecting said sperm cells having the desired sex characteristic.

Claim 16 (twice amended).

A method of producing a mammal as described in claim 15 wherein said steps of separating said sperm cells according to the determination of their sex characteristic further comprises the steps of:

- a. providing a flow cytometer;
- b. establishing a sheath fluid for said sperm cells; and
- [e] c. collecting said sperm cells having the desired sex characteristic.

Claim 17 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 wherein [said steps of determining the sex characteristic of a plurality of said sperm cells and sorting said sperm cells according to the determination of their sex characteristic comprise the steps of:

- a. establishing a cell source which supplies sperm cells to be sorted;
- b. establishing a sheath fluid for said sperm cells;
- c. sensing a property of said sperm cells;
- d. discriminating between said sperm cells having a desired sex characteristic; and
- e.] collecting said sperm cells having the desired sex characteristic [while] further comprises the step of cushioning said sperm cells from impact with a collector [wherein a cushioning element comprises initial collection fluid in the bottom of said collector and wherein said collector has a configuration sufficiently large to avoid impact of said sperm cells with said collector].

Claim 18 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 wherein said step[s] of [determining the sex characteristic of a plurality of said sperm cells and sorting said sperm cells according to the determination of their sex characteristic comprise the steps of:

- a. establishing a cell source which supplies sperm cells to be sorted;
- b. establishing a sheath fluid for said sperm cells;
- c. sensing a property of said sperm cells;
- d. discriminating between said sperm cells having a desired sex characteristic; and

- e. collecting said sperm cells having the desired sex characteristic in a citrate collection fluid containing about six percent egg yolk prior to commencing said step of collecting] providing a sorting flow cytometer comprises providing a high speed sorting flow cytometer, wherein said high speed flow cytometer sorts said sperm cells at a rate of at least 500 sorts per second.

Claim 19 (once amended).

A method of producing a mammal [of a desired sex] as described in claim 3 and further comprising the step of [sorting said sperm cells at a rate of at least 500 sorts per second] using an ovulatory pharmaceutical to cause multiple eggs to be produced.

Claim 20 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 19 [and further comprising the step of using an ovulatory pharmaceutical to cause multiple eggs to be produced and wherein said step of fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable ( $p > 0.1$ ) to the typical unsorted artificial insemination dosage comprises the step of fertilizing a plurality of said eggs to produce multiple, embryos having a predetermined sex,] wherein said ovulatory pharmaceutical is injected in half day increments between any of days 2 and 18 of the estrus cycle.

Claim 21 (once amended).

A method of producing a mammal (having a predetermined sex) as described in claim 20 wherein said step of using an ovulatory pharmaceutical to cause multiple eggs to be produced comprises the step of injecting a dosage of follicle stimulating hormone.

Claim 22 (twice amended).

A method of producing a mammal (having a predetermined sex) as described in claim 21 wherein said step of injecting said dosage of follicle stimulating hormone in approximately



half day increments comprises a dosage level of 6, 6, 4, 4, 2, 2, 2, and 2 mg between days 9 and 12 inclusive of the estrus cycle and further comprising the step of injecting 25 mg and 12.5 mg of prostaglandin F-2-alpha on the sixth and seventh dosages, respectively, of said follicle stimulating hormone.

Claim 23 (twice amended).

A method of producing a mammal as described in claim 16 and wherein said step of determining the sex characteristic of a plurality of said sperm cells and said step of sorting said sperm cells according to the determination of their sex characteristic further comprises the step of staining sperm cells of a male mammal with at least about 38 micro-molar content of stain.

Claim 24 (once amended).

A method of producing a mammal having a predetermined sex as described in claim 16 [where said step of determining the sex characteristic of a plurality of said sperm cells comprises the step of staining said cells with a 38 micro-molar concentration of stain] further comprising the step of chemically coordinating a sheath fluid environment for sperm cells which is coordinated with both pre-sort and post-sort sperm cell fluid environments.

Claim 25 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1, 2, 14, 15, 16, 17 or 18 [and further comprising the step of chemically coordinating a sheath fluid environment for sperm cells which is coordinated with both pre-sort and post-sort sperm cell fluid environments] wherein collecting sperm cells from a male of a species of mammal comprises collecting said sperm cells from a male of a species selected from the group consisting of bovines, and equines.

Claim 26 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 25 wherein said step of chemically coordinating a sheath fluid to create a sheath fluid environment for said sperm cells which is coordinated with both a pre-sort and a post-sort cell fluid environments comprises the step of establishing a cell source which supplies bovine sperm cells and the step of establishing a sheath fluid which contains about 2.9% sodium citrate.

Claim 27 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 25 wherein said step of chemically coordinating a sheath fluid to create a sheath fluid environment for said cells which is coordinated with both a pre-sort and a post-sort cell fluid environment comprises the step of establishing a cell source which supplies equine sperm cells and the step of establishing a sheath fluid which contains a hepes buffered medium.

Claim 28 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 wherein said step of [sorting said sperm cells according to the determination of their sex characteristic] collecting said sperm cells having the desired sex characteristic further comprises the step of [cushioning said cells from impact with a collector wherein cushioning said sperm cells comprises collecting said sperm cells into an initial collection fluid in the bottom of said collector and wherein said collector has a configuration sufficiently large to] avoiding impact of said sperm cells with said collector.

Claim 29 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 28 wherein said step of [cushioning said cells from impact with a collector] avoiding impact of said sperm cells with said collector comprises the step of providing a collection container having a diameter of at least fifteen millimeters.

Claim 165 [183].

A method of producing a mammal as described in claim 28 wherein said step of avoiding impact of said sperm cells with said collector comprises the step of providing a collection container having stream matched physical characteristics.

Claim 166 [184].

A method of producing a mammal as described in claim 16 wherein said step of collecting said sperm cells having the desired sex characteristic further comprises the step of providing a citrate collection fluid containing about six percent egg yolk prior to commencing said step of collecting.

Claim 167 [185].

A method of producing a mammal as described in claim 18 further comprises the step of operating said flow cytometer with in the range of about 5 kilohertz to about 50 kilohertz.

Claim 168 [186].

A method of producing a mammal as described in claim <sup>167</sup>~~185~~ further comprises the step of sorting said sperm at a rate of at least 1200 sorts per second.

Claim 169 [187] (once amended).

A method of producing a mammal as described in claim [3] 1 wherein said step of establishing a insemination sample having [a low] no more than 10% of the number of said sperm cells relative to the typical artificial insemination dosage comprises the step of establishing an insemination sample selected from the group consisting of: a bovine insemination sample of no more than one hundred thousand sperm cells, a bovine insemination sample of no more than two hundred fifty thousand sperm cells, a bovine insemination sample of no more than three hundred thousand sperm cells, an equine insemination sample of no more than one million sperm cells, an equine insemination sample

of no more than five million sperm cells, an equine insemination sample of no more than ten million sperm cells, and an equine insemination sample of no more than twenty-five million sperm cells.

Claim 170 [188].

A method of producing a mammal as described in claim 4 wherein said steps of inserting at least a portion of said insemination sample into a female species of said mammal and fertilizing at least one egg within said female species of said mammal at success levels statistically comparable to the typical unsexed artificial insemination dosage in a field environment comprises the steps of repetitively inserting a significant number of insemination samples into a significant number of female specie of said mammal in rapid succession and in farm or ranch conditions.

Claim 171 [189].

A method of producing a mammal as described in claim 14 wherein said step of inserting said insemination sample having said low number of said sperm cells into a female of said species of said mammal comprises inserting an insemination sample having a low number of sperm a substantial portion of which have the desired sex characteristic.

Claim 172 [190].

A method of producing a mammal as described in claim <sup>171</sup>189 wherein said step of inserting an insemination sample having a low number of sperm, wherein a substantial portion of said sperm have the desired sex characteristic comprises selecting said insemination sample having a low number of sperm from a group consisting of an insemination sample having a low number of sperm, wherein at least 60 percent of said sperm have the desired sex characteristic, an insemination sample having a low number of sperm, wherein at least 70 percent of said sperm have the desired sex characteristic, an insemination sample having a low number of sperm, wherein at least 80 percent of said sperm have the desired sex

characteristic, and an insemination sample having a low number of sperm, wherein at least 90 percent of said sperm have the desired sex characteristic.

Claim 173 [191].

A method of producing a mammal as described in claim <sup>172</sup>~~190~~ wherein said step of producing an offspring mammal comprises producing a predetermined sex ratio of fetuses.

## CONCLUSION

The applicant has amended claim 1 pursuant to the suggestions of the examiner and now believes that with respect to claims 1-2, 5-29, and 165-173 as amended, the office has not established a prima facie case of anticipation nor a prima facie case of obviousness with respect to the claimed subject matter. Claims 3 and 4 have been canceled without prejudice. The applicant has renumbered claims 183-191 and with respect to claims 1, 15, 16, and 23, the applicant has consecutively labeled the elements with letters, as suggested by the examiner.

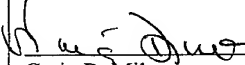
Based upon the foregoing the applicant believes that the claims as amended are now in condition for allowance. The applicant respectfully requests allowance at the examiner's earliest convenience of claims 1-2, 5-29, and 165-173.

The applicant respectfully requests a telephone interview to address any remaining concerns that the examiner may have.

Dated this 12 day of February 2002.

Respectfully Submitted,  
SANTANGELO LAW OFFICES, P.C.

By:

  
Craig R. Miles

ATTORNEY FOR APPLICANT

PTO No. 45,954

125 South Howes, Third Floor

Fort Collins, Colorado 80521

(970) 224-3100